DOCUMENT RESUME

ED 221 823 CS 006 585

AUTHOR Alvermann, Donna E.; Ratekin, Ned H.
TITLE Metacognitive Knowledge about Reading Proficiency: Its Relation to Study Strategies and Task Demands.
PUB DATE Mar 82
NOTE 21p.; Revised version of a paper presented at the Annual Meeting of the American Educational Research Association (New York, NY, March 19-23, 1982).

EDRS PRICE MF01/PC01 Plus Postage.
DESCRIPTORS Essay Tests; Grade 7; Grade 8; Junior High Schools; Learning Theories; *Metacognition; Multiple Choice Tests; *Performance; Predictive Measurement; *Reading Research; *Reading Tests; Self Concept; *Self Evaluation (Individuals)
IDENTIFIERS *Reading Strategies

ABSTRACT

Working on the assumptions that person, strategy, and task are essential metacognitive variables for explaining effective learning and that a reader's metacognitive knowledge about his or her strengths and limitations necessarily influences the types of strategies applied to different tasks, investigators studied the degree to which seventh and eighth grade readers could predict their level of proficiency in dealing with different task demands. Specifically, 98 seventh and eighth grade students were given a questionnaire developed to ascertain students' perceptions of their ability to complete essay and multiple-choice tests. Subjects then read one of two folk tales, took the appropriate test, retrospectively reported on the strategies they used, and freely recalled the folk tale read. Results indicated that when the scores on the essay and free recall measures were adjusted for prior reading achievement, the self-perceived high proficiency group performed significantly better than the self-perceived low proficiency group. There was also some evidence to suggest that students' perceptions of proficiency affected their choice of strategic activity. Namely, students who perceived themselves as having low proficiency in dealing with the criterial tasks reported "reading carefully/slowly" significantly more often than those who perceived themselves as having high proficiency. Finally, an analysis of the effect of criterial task on strategy selection revealed that students who read and studied for an essay test "reread" more frequently than students who prepared for a multiple-choice test. (HOD)

****
* Reproductions supplied by EDRS are the best that can be made *
* from the original document. *
****

ED221823

U.S. DEPARTMENT OF EDUCATION
NATIONAL INSTITUTE OF EDUCATION
EDUCATIONAL RESOURCES INFORMATION
CENTER (ERIC)
This document has been reproduced as received from the person or organization originating it.
X Minor changes have been made to improve reproduction quality.
• Points of view or opinions stated in this document do not necessarily represent official NIE position or policy.

REVISED MANUSCRIPT
(# 011-82)

METACOGNITIVE KNOWLEDGE ABOUT READING PROFICIENCY: ITS RELATION TO STUDY STRATEGIES AND TASK DEMANDS[1]

Donna E. Alvermann
University of Georgia[2]

Ned H. Ratekin
University of Northern Iowa

"PERMISSION TO REPRODUCE THIS MATERIAL HAS BEEN GRANTED BY
Donna E. Alvermann
TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)."

[1]A version of this paper was presented at the 1982 Annual Meeting of the American Educational Research Association in New York City.

[2]Appointment effective 9/1/82. Please address any correspondence to: Dr. Donna E. Alvermann, 159B Education Center, University of Northern Iowa, Cedar Falls, IA 50614.

CS 006 585

METACOGNITIVE KNOWLEDGE ABOUT READING PROFICIENCY:
ITS RELATION TO STUDY STRATEGIES AND TASK DEMANDS

Metacognition, according to Flavell (1976), refers to an awareness of and an ability to capitalize on one's own knowledge and thought processes as these are applied to some specific task. It is that general knowledge, then, which guides a reader in monitoring his or her comprehension processes through the selection and implementation of specific strategies to achieve some predetermined goal. Although the term metacognition is relatively new, the reading skills to which it refers have been discussed since the turn of the century (Dewey, 1910; Huey, 1908).

In an effort to separate two (though not necessarily independent) phenomena associated with metacognition, Baker and Brown (1980) divided metacognitive activities into different clusters. The first cluster is concerned with the learner's awareness of any incompatibility between available knowledge and the complexity of the task at hand. The second cluster of activities is concerned with the active monitoring of one's own cognitive processes while reading. Directly related to metacognitive awareness of one's limitations and effective monitoring is the deployment of appropriate strategies. According to Baker and Brown, the choice of strategies will vary depending on whether the goal is to read for meaning (comprehension) or for remembering (studying). Obviously, the latter involves all the activities of reading for meaning and then some.

Investigations that focus on the metacognitive aspects of reading for remembering comprise only a small portion of the literature on effective study techniques (Anderson & Armbruster, in press). Only recently have researchers begun to take an interest in what study strategies the reader

uses during reading that may, or may not, facilitate remembering of text. Brown and Smiley (1978), for instance, found that simply extending the amount of study time resulted in improved recall of essential information for students at seventh grade and above. A series of studies by Bransford, Stein, Shelton, and Owings (1980) also investigated the use of study time. Results of these studies showed that less able students had little awareness of the influence that text and task characteristics have on effective studying. However, in subsequent research, Bransford, et. al found that poor readers, after training, revealed differential study time for congruent and incongruent passages. Differences in good and poor readers' monitoring and problem-solving strategies were also noted by Hare and Smith (1982) in their investigation of sixth and seventh graders' ability to read for remembering.

In these and other studies, however, subjects were classified as proficient or less proficient readers on the basis of age and/or traditional reading ability measures. The degree to which subjects' metacognitive knowledge about their own proficiencies as readers (irrespective of their measured abilities) will interact with comprehension and strategy use under different criterial tasks has not been explored. The present study was designed, therefore, to address the following questions:

(1) Will 7th- and 8th-grade "average" readers (as defined by a standardized reading test) accurately predict their level of proficiency (high or low) in dealing with different task demands (completing a multiple-choice or completing an essay test)?

2) Will the number of idea units freely recalled differ significantly for self-perceived high- and low-proficiency readers under the two task demands?

3) Will the strategies that students reported they used during reading in order to complete the multiple-choice test differ in type or incidence from those which they reported they used during reading to complete an essay test?

4) Will the reading strategies reported by students who predicted they would perform "high" on the criterial tasks differ in type or incidence from those reported by students who predicted they would perform "low"?

Two assumptions form the rationale of the study and provide a framework within which the results are interpreted. First, person, strategy, and task are essential metacognitive variables for explaining effective learning (Flavell & Wellman, 1977). Second, a reader's metacognitive knowledge about his or her strengths and limitations necessarily influences the types of strategies applied to, as well as level of performance on, different tasks (Brown, 1980).

Method

Subjects

Ninety-eight 7th- and 8th-grade students (51 girls and 47 boys) served as the subjects in this study. All had obtained stanine scores of 4, 5, and 6 on the reading subtest of the Iowa Tests of Basic Skills five months prior to data collection. The subjects attended a small, Midwestern city school which drew students from different socioeconomic levels and had a minority population of 22.7 percent.

Materials

A questionnaire was developed to ascertain students' perceptions of their ability to complete essay and multiple-choice tests. To avoid the warm-up effect noted by Johns and Ellis (1976) and to affirm the investigators' interest in students' opinions, the first three questions merely sought general information about characteristics that distinguish skilled and less-skilled readers. Questions 4, 5, 6, and 7 were modeled after those of Myers and Paris (1978) and served as transitions in getting students to think about person and task variables related to school reading assignments. Questions 8, 9, 10, and 11 were considered the target items. These items sought through hypothetical reading situations involving folk tales to tap students' predictions of how they would score ("high" or "low") on essay and multiple-choice tests. Questions 12 and 13 dealt with oral versus silent reading preferences.

Folk tales were chosen as the stimulus materials for two reasons: 1) students ususally find them interesting, and 2) those in the essay condition could apply the folk tale's lesson to their own lives. Thus, it was possible to provide a common focus for their essays and at the same time minimize problems due to differences in students' background knowledge, such as might have been the case if social studies or science materials had been used. Two Japanese tales, "The Dragon's Tears" and "How to Fool a Cat" were selected on the basis of their substantial research history (Brown & Smiley, 1977; Smiley et al., 1977), and for their known appeal to all ages. Both conveyed a moral, featured a trick ending, and were comparable in their lengths (390 vs. 430 words), their readability levels (5.2 vs. 5.4 on the Dale Chall), and their number of idea units (59 vs. 54).

A 10-item multiple-choice test was constructed for each of the two folk tales. Each test consisted of 5 literal and 5 inferential questions. Sample questions from "The Dragon's Tears" follow:

(Literal) 2. What event prompted the little boy to steal quietly from his home?

a. his upcoming birthday party

b. a quarrel with his mother

c. unfriendly neighborhood talk

d. a particularly bad nightmare

(Inferential) 5. The dragon was overcome with tears because

a. pretty sounding words made him weep

b. he had missed the little boy's party

c. people generally misunderstood him

d. he was in a particularly depressed mood

Essay tests were also prepared for each of the folk tales. They consisted of two written sets of directions to the student. The first set directed the student to write the moral or lesson that the folk tale taught. The second set required a brief description of how the identified moral might apply to the student's life. Essay scoring criteria ranged from 0 to 2 in each of these five areas: identification of the moral, relationship of the moral to one's life, coherence, length, and degree of content match between folk tale and essay.

To illustrate the application of these scoring criteria, the essays of subjects #136 and #134 on "How to Fool a Cat" are included. The original spelling, punctuation, and grammar have been retained. Following these essays is a completed scoring key.

(Essay #136) "The moral is to really think and not try to be the best, but be creative and think out what you are doing. On Mothers Day when my mom opened her presents, you could tell what she liked best because, when she opened the present from me, she said, "Thank you, you are so sweet,"

but when she opened my younger sisters, you could really see the sparkle in her eyes, because my sister had made her a card. And my mom thought she was really nice of her to make that. It doesn't mean she doesn't love me as much. She just is attracted by something made by her own child."

(Essay #134) "The moral is to be clever and the more clever you are the more it pays off in the future. When your young and going to school, learn as much as possible. Maybe you don't like it, but in the future you could get a good job and hopefully be happy. The one who didn't do well in school would have trouble in college and probably not end up as well off."

	Essay Scores	
Scoring Criteria	#136	#134
Identified moral	2	2
Related moral to self	2	1
Coherence	2	1
Length	1	1
Content match between folk tale & essay	2	0

Procedure

The study was conducted in two phases. Initially, all 7th and 8th graders in the school completed the questionnaire described above. Only average readers (those scoring at stanines 4, 5, and 6 on the reading subtest of the Iowa Tests of Basic Skills) formed the pool of 185 students

from which 100 were randomly selected for the study. Each of these 100 students was then assigned to one of four groups based on self-perception of high or low expected performance on essay or multiple-choice tests. The groups were balanced insofar as possible for grade level, sex, and minority representation.

One month later, individual sessions were held in which all subjects silently read one of two folk tales (folk tales counter-balanced across groups). Prior to reading, the students were told to read the folk tale and to prepare for the test appropriate for the group to which they were assigned (either multiple-choice or essay). Following reading, the subjects completed a multiple-choice or essay test. The obtained scores were used as a check on the accuracy of the students' ability to predict their performance on the different criterial tasks. The 10 multiple-choice questions counted 10 points each. Two independent raters (interrater reliability = .94) judged the essays on a scale of 0 to 10. Incomplete data on two subjects resulted in a final sample size of 98.

Finally, the investigators interviewed each subject, using a standardized interview format, to determine what strategies each remembered using as he or she read the folk tale. Subjects' retrospective reports were taped and later transcribed. Olshavsky's (1976-77) method of identifying and categorizing strategies was employed. Since the interview did not tap specific folk tale information, it served as an intervening task to control for short-term memory effects in the free recall activity that followed. Directions for the free recall simply involved asking students to write down as much as they could remember about the folk tale they had read. A blank piece of paper with the appropriate folk tale title was supplied. Two judges (interrater reliability = .91) scored the written protocols for gist recall, using Brown and Smiley's (1977) coded worksheets.

These worksheets contained the complete text of each folk tale, divided into idea units, following a procedure developed by Johnson (1970). One point was awarded for each idea unit that retained the gist of the original text.

Results

Preliminary data analysis suggested no significant difference due to folk tale or sex. Nor were there any significant correlations among the multiple dependent measures, as illustrated in Table 1.

Insert Table 1 about here

Accuracy in Predicting Proficiency

Essay test scores and multiple-choice test scores for students predicting high and low performance on these two criterial tasks were averaged for each of the four groups. The resulting means and standard deviations are reported in Table 2. Separate one-way analysis of covariance procedures with self-perceived proficiency as the between subjects factor and actual reading ability (ITBS) as the covariate were performed on both the essay and multiple-choice data sets. Results of the analysis on the essay measure indicated that even after adjusting for reading ability a significant difference existed between the self-perceived high and low groups, $F(1,45) = 8.71$, $p < .001$. This difference favored the high group. However, once scores on the multiple-choice measure were adjusted for actual reading ability, there was no difference between the self-perceived high and low groups.

Insert Table 2 about here

Table 1

Correlational Matrix for Multiple Dependent Measures

	Essay Test	Multiple-Choice Test	Free Recall
Essay Test	1.00		
Multiple-Choice Test	.00	1.00	
Free Recall	.27	.12	1.00

Table 2

Means and Standard Deviations for Students Predicting High and Low Proficiency on Essay and Multiple-Choice Tests

Test	High Essay Prediction Mean (SD)	Low Essay Prediction Mean (SD)	High Multiple-Choice Prediction Mean (SD)	Low Multiple-Choice Prediction Mean (SD)
Essay	4.33[a] (2.07)	2.60 (1.78)		
Multiple Choice			84.05[b] (11.17)	70.76 (13.82)
Free Recall	.379[c] (.127)	.286 (.120)	.343 (.127)	.227 (.131)

[a]Maximum essay test score = 10

[b]Maximum multiple-choice test score = 100

[c]Idea units expressed as proportions

Effect of Self-Perceived Proficiency and Task on Idea Unit Recall

To determine if level of perceived proficiency and the demands of studying for either an essay or multiple-choice test would have differential effects on subjects' free recall, a two-way analysis of covariance was conducted, again using actual reading ability as the covariate. As indicated in Table 2, the results of this analysis confirmed a significant main effect for self-perceived proficiency, $F(1,93) = 14.24$, $p < .001$. That is, regardless of prior reading achievement, subjects who perceived themselves as having high proficiency in dealing with essay or multiple-choice tests recalled more of what they read than those who perceived themselves as having low proficiency in these tasks. Finally, there was no main effect for criterial task and no interaction between task and proficiency.

Classification of Strategies

An analysis of strategies which students reported they used during reading resulted in identification of the following seven categories:

1. Reread
2. Read carefully/slowly
3. Read for details
4. Read for main ideas
5. Personal identification
6. Imaging
7. No specific strategy

The first four categories (reread, read carefully/slowly, read for details and read for main ideas) were easy to distinguish from one another largely because students used similar terminology. Examples of strategy statements in each of these four categories follow. Two examples of

multiple strategies are included also.

Reread

"I read it over - each paragraph twice - until I remembered what it said."

"I remembered it by going over the story 2 times."

Read carefully/slowly

"I read the story very carefully and I thought I won't remember it but it always comes back."

Multiple strategies: reread and read carefully/slowly

"I reread the story and read it slowly."

Read for details

"Read it so I could remember in detail what the story was about by remembering some of the words."

Multiple strategies: reread and read for details

"I read it once and then I read it over again to make sure I didn't miss any details."

Read for main ideas

"Tried to remember the main ideas."

"I looked for the most important parts of the story. For example, the man that collected the carvings of animals did not planned (sic) on being fooled. The second carver planned his idea out very carefully because he wanted to get the bag of gold."

Although all students did not produce such clear-cut answers, it was fairly easy to categorize most responses based on their descriptive nature. For instance, the strategy statement "I thought of how I would feel if I was the dragon" was placed in the personal identification category, while "The way I remember a story is I put pictures in my head as the

story goes along" was classified as imaging. Those responses which were most difficult to classify initially included statements such as "When I read I remember it in my head" and "I just read it good and then when I answer questions it comes back to me." Eventually, these were placed in the "no specific strategy" category.

A single strategy was reported by 55 students, while 30 of the students reported two or more strategies. Thirteen students were unable to recall any specific strategy. Interrater agreement between two independent judges who classified each of the strategy statements was .93.

Comparison of Strategies by Task

The incidence of strategies reported by students reading under the two task conditions and two proficiency levels appears in Table 3. This table presents the proportion as well as the number of students reporting each strategy since the four groups contained unequal numbers of students.

Fisher's exact probability test was used to determine the significance of differences in configurations of students reporting and not reporting each strategy between the two task groups and between the two proficiency groups. This test was selected rather than a chi-square to overcome the problem of low cell frequency.

The strategy "rereading" was reported by 40 students and was the only strategy of the seven which yielded a significant difference (Fisher's exact $p < .05$) between students in the two task groups. As seen in Table 3, 25 of the 48 students who completed the essay test, compared to 15 of the 50 students who completed the multiple-choice test, reported rereading as a strategy. Students who read to complete an essay test reported using multiple strategies nearly twice as often as students who read for a multiple-choice test. The proportion was .40 for the essay group compared

to .22 for the multiple-choice group. Of those students in the essay group who reported multiple strategies, 9 had rated themselves as having high proficiency in dealing with essay exams, and 10 had rated themselves as having low proficiency.

Insert Table 3 about here

Comparison of Strategies by Perceived Proficiency

The type and number of strategies reported by students who predicted high and low proficiency on the two criterial tasks also appear in Table 3. The strategy "read carefully/slowly" was reported by significantly more students who predicted low proficiency on both tasks (Fisher's exact, $p < .05$). There was no difference in the total number of strategies reported by the two groups.

Discussion

According to Baker and Brown (1980), metacognitive activities can be separated into two different though not distinct clusters: those that focus on the learner's knowledge about his or her own proficiency in meeting specific task demands and those that focus on self-regulatory mechanisms, such as planning, monitoring, and evaluating. The present study was interested in the first of these two clusters, particularly in the relationship between readers' self-perceived proficiency and their strategic activity under different task demands.

Average 7th- and 8th-grade readers, as defined by the reading subtest of the Iowa Tests of Basic Skills, were selected as subjects. By limiting our sample to subjects who scored at stanines 4, 5, and 6,

Table 3

Frequency and Percent of Students Reporting Specific Strategies

Under Two Task Conditions and Two Levels of Perceived Proficiency

			Task				Proficiency			
			Essay		Mult.-Choice		Low		High	
Strategy	% of total (n = 98)	Freq. of total	(n = 48) Perc.	Freq.	(n = 50) Perc.	Freq.	(n = 37) Perc.	Freq.	(n = 61) Perc.	Freq.
Reread	41	40	52	25*	30	15	49	18	36	22
Carefully	23	23	21	10	26	13	38	14*	15	9
Details	21	21	15	7	28	14	16	6	25	15
Main Ideas	16	16	21	10	12	6	14	5	18	11
Personal	10	10	6	3	14	7	5	2	13	8
Imaging	5	5	8	4	2	1	5	2	5	3
Total Strategies				59		56		47		68
Multiple Strategies	31	30	40	19	22	11	38	14	26	16
No Strategy	13	13	15	7	12	6	11	4	15	9

* Significant differences determined by the Fisher Test of Exact Probability

we hoped to ensure some degree of similarity in reading ability, at least as it is currently measured by standardized achievement tests. Then, any difference in performance on one of our three dependent measures which could not be explained by measured reading ability might be attributed, in part at least, to differences in self-perceived ability.

As the results indicated, students accurately predicted their level of proficiency in reading and studying for the essay test. When scores were adjusted for measured reading ability, the self-perceived high proficiency essay group still exceeded the self-perceived low proficiency group. The same relationship did not hold in the multiple-choice condition. Although students who had predicted high proficiency in reading for a multiple-choice test did score higher on the test as a group than those who had predicted low proficiency, this difference was not significant once prior reading achievement had been partialed out. Individual differences beyond those which could be explained by standardized test results, however, did exist for the free recall measure. As was true in the essay condition, a significant effect was found for self-perceived proficiency, and that effect favored the self-perceived high proficiency group.

What these results tentatively and partially suggest is the importance of looking at subjects' metacognitive awareness of their available knowledge in addition to standardized testing of that knowledge. This seems particularly appropriate given that the selection of subjects in much of the good and poor reader research is typically dependent upon standardized norm-referenced test results (Aulls, 1981). Perhaps by

assessing self-perceived proficiency prior to drawing conclusions about a reader's competence, we may better define "good and poor" readers for research purposes.

There is some evidence in the present study that students' perceptions of proficiency affected their choice of strategic activity. Namely, students who perceived themselves as having low proficiency in dealing with the criterial tasks reported "reading carefully/slowly" significantly more often than those who perceived themselves as having high proficiency. Also, an analysis of the effect of criterial task on strategy selection revealed that students who read and studied for an essay test "reread" more frequently than students who prepared for a multiple-choice test.

The fact that "reading carefully/slowly" and "rereading" were the strategies of choice is somewhat disturbing because of their generally passive nature. Moreover, the results of this study suggest that 7th- and 8th-grade average readers may have only a limited awareness of the entire range of strategic activities available. Or, perhaps of equal educational significance, is the alternative hypothesis that these students revealed the nature of what they found inherently useful from past reading instruction. Finally, the fact that they did not report using other strategies may have been due more to a failure to recognize the need for strategic intervention than to either limited awareness or prior instruction. This latter interpretation would lend support to Brown's (1980) contention that merely "having" knowledge of strategy routines is not in itself adequate for effective study behavior.

References

Anderson, T. H., & Armbruster, B. B. Studying. In P. D. Pearson (Ed.), Handbook of reading research. New York: Longman, in press.

Aulls, M. Developmental considerations for reading research: Applications to good and poor reader research. In M. L. Kamil (Ed.), Directions in reading: Research and instruction, Thirtieth Yearbook of the National Reading Conference, 1981.

Baker, L., & Brown, A. L. Metacognitive skills and reading. Tech. Report No. 188. Urbana, IL: Center for the Study of Reading, 1980.

Bransford, J. D., Stein, B. S., Shelton, T. S., & Owings, R. A. Cognition and adaptation: The importance of learning to learn. In J. Harvey (Ed.), Cognition, social behavior and the environment. Hillsdale, NJ: Lawrence Erlbaum Associates, 1980.

Brown, A. L. Learning and development: The problems of compatibility, access, and induction. Tech. Report No. 165. Urbana, IL: Center for the Study of Reading, 1980.

Brown, A. L., & Smiley, S. S. Rating the importance of structural units of prose passages: A problem of metacognitive development. Child Development, 1977, 48, 1-8.

Brown, A. L., & Smiley, S. S. The development of strategies for studying texts. Child Development, 1978, 49, 1076-1088.

Dewey, J. How we think. Boston: D. C. Heath, 1910.

Flavell, J. H. Metacognitive aspects of problem solving. In L. B. Resnick (Ed.), The nature of intelligence. Hillsdale, NJ: Lawrence Erlbaum Associates, 1976.

Flavell, J. H., & Wellman, H. M. Metamemory. In R. V. Kail, Jr., & J. W. Hagen (Eds.), Perspectives on the development of memory and cognitition. Hillsdale, NJ: Lawrence Erlbaum Associates, 1977.

Hare, V. C., & Smith, D. C. Reading to remember: Studies of metacognitive reading skills in elementary school-aged children. Journal of Educational Research, 1982, 75, 157-164.

Huey, E. B. The psychology and pedagogy of reading. New York: Macmillan, 1908. Reprinted by MIT Press, Cambridge, MA, 1968.

Johns, J., & Ellis, D. Reading: Children tell it like it is. Reading World, 1976, 16, 115-128.

Johnson, R. E. Recall of prose as a function of the structural importance of the linguistic unit. Journal of Verbal Learning and Verbal Behavior, 1970, 9, 12-20.

Myers, M., II, & Paris, S. G. Children's metacognitive knowledge about reading. Journal of Educational Psychology, 1978, 70, 680-690.

Olshavsky, J. E. Reading as problem solving: An investigation of strategies. Reading Research Quarterly, 1976-77, 12, 654-674.

Smiley, S. S., Oakley, D. D., Worthen, D., Campione, J. C., & Brown, A. L. Recall of thematically relevant material by adolescent good and poor readers as a function of written versus oral presentation. Journal of Educational Psychology, 1977, 69, 381-387.